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ABSTRACT

In this study four research strategies used in previous studies of the socialization of cognitive skills were first contrasted and then assessed in terms of five criteria. (The data base for this study was 32 videotapes of mothers preparing their 7- or 9-year-old children to take a memory test.) The four strategies (frequency coding, fine-grained sequential analysis, single-case ethnography, and comparative ethnography) are discussed in terms of their utility for providing an empirically adequate account of how individuals achieve meaningful communication within the context of an evolving interaction. Strategies are then evaluated in terms of (1) the questions each method can answer, (2) procedures related to data analysis, (3) problems of assessing the validity of the analysis, (4) problems of assessing the reliability and validity of data collection, and (5) limits each strategy imposes on statements concerning the generality of the findings. While all of the strategies were found to have utility for examining particular aspects of data on the socialization of cognitive skills, neither frequency coding nor fine-grained sequential analysis were found to represent adequately the complexity of the dyadic interaction. The single-case ethnographic method, however, was found to provide accounts of how participants jointly accomplished cognitive tasks, how mothers established and maintained a common framework, and how both mother and child dyads worked toward a transfer of responsibility for the direction of the task. In order to examine the prevalence of structures of interaction found in the single-case ethnographies, two multi-case, comparative ethnographic studies are presently being conducted. (Author/RH)

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Steps Leading to an Ethnographic Analysis of Mothers Preparing Children for a Memory Test

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In this presentation we contrast four research strategies that we have used in studies of instruction and the development of cognitive skills.

Our data base is 32 videotapes of mothers teaching their 7 or nine year old children. The mothers are preparing their children to take a memory test on the organization of either groceries on kitchen shelves (which we call the home task) or photos of household items in compartments (which we call the school task).

We will first chronicle our research efforts through the four strategies, listed on your handout:

1. Frequency coding
2. Fine-grained sequential analysis
3. Single-case ethnography
4. Comparative ethnography

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We will explain why we have explored each of these strategies in our research on the socialization of cognitive skills. We will then compare them on five criteria (also listed on your handout).

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We began our analysis of the videotapes by devising a fixed coding scheme to determine the frequencies of relevant actions by the mothers and children. We counted occurrences of verbal and nonverbal references to the membership of items in groups, to the requirements of the experimental task, and to the demands of the task on the child's memory, among other things. For example, the stretch of transcript in your handout was coded as including two gestures by the mother and one by the child, two references to a category label

by the mother, etc. This coding gave us a picture of the methods of instruction used by the mothers, and the patterns of response to instruction by the children. The variables were examined for the effects of the age of the children and compared for the home vs. school tasks.

While the results of these studies were interesting, we were frustrated by their methodology. Reducing the data base to a few coded categories seemed to require some arbitrary decisions concerning what constituted a discrete behavior. With hindsight, we would say that discrete behaviors are not 'given' in reality and then 'found' by observers. Rather, they are constituted by observers from the "thick" information in the interaction. What troubled us then and now, however, was our belief that the coding process removed the behavioral events from the contexts of the interaction necessary to grasp their meaning.

The interactional context contributes to the meaning of any act in a manner lost with the creation of a discrete behavioral event. For example, topographically identical behaviors may be interpreted in several ways depending on the history of the interaction. Thus the mother's question "What do you think goes next?" may mean one thing if a child has just solved a similar problem in the experimental task, but quite another if it follows a succession of errors. Neither possibility has been captured, however, if it is simply given the label "open-ended question". Our static frequency code abstracted the behavioral events from the work the dyad was doing on the problems of teaching and learning.

This came home to us when we anlayzed the coded data. We found that our interpretations of the meaning of statistical differences derived from our direct observation of the interactions, during the piloting and running of the dyads, before we had reduced this information to the coded frequencies. It concerned us that we were retrieving the meaning of our data unsystematically, and only after carefully removing the data from the contexts which permitted their interpretation.

So we sought an alternative methodology that included some of the complexity, structure, and movement inherent in interaction. Our fine-grained sequential analysis involved similar behavior categories, but retained the time structure relating each act by the mother and by the child. For example, the transcript in the handout would be segmented into the sequence of mother's turn, child's turn, etc., with four turns by each in this stretch of transcript. Each segment would then be coded, and the sequence of codes would be analyzed. This allowed us to compare interactions occurring early vs. late in the transcript, and to analyze the contingencies between, say, the mother's behavior in a segment and the child's behavior in the next segment.

We found fine-grained sequential studies to be extremely time consuming; and we achieved relatively few interesting findings through them. Moreover, the method could not in principle solve the problems we were concerned with. Although we turned to a sequential method to look at event in the context of what precedes and follows them, we were still unable to handle the fact that at any point in an interaction the participants are working in several dimensions of behavior. For example, a mother may be simultaneously maintaining her child's attention, evaluating the pace of instruction, maintaining her social status relative to the child, and working on a specific component of the task. Sequential analysis, like frequency counts, requires an observer to create a single behavioral event from the flow of the interaction at any point in time. The coded event is assigned the same meaning wherever it occurs, across dyads and across time within dyads. Such analysis loses the participants' adaptations to the changing circumstances of the problem as they develop its solution.

If nothing else, the experience with fine-grained sequential analysis clarified what we wanted to know. Whereas traditional psychological research attempts to relate discrete behaviors to discrete causes, we wanted to investigate how individuals achieve meaningful communication within the context of an evolving interaction. What evolves in an interaction is a jointly achieved framework of meaning in terms of which the participants communicate. This is obscured by dividing the cooperative actions of mother and child into behaviors for which only one is given credit.

In our subsequent attempts to examine how the interactional framework is constructed, we were influenced particularly by the work of Cicourel, Mehan, Cazden, and McDermott, who argue that participants in social interaction signal the intended meanings of their actions to each other. These signals are available to the researcher and provide evidence for arguments concerning the meaning of the interaction. McDermott, Gospodinoff, and Aron argue that "we can use the ways members have of making clear to each other and to themselves what is going on to locate to our own satisfaction an account of what it is that they are doing with each other. In fact, the ways they have of making clear to each other what they are doing are identical to the criteria which we use to locate ethnographically what they are doing."

We first applied these methods in what we will call single-case ethnography. Gardner and Rogoff carried out an intensive, interpretive analysis of one dyad's preparation for the memory test. Working from the transcript of the interaction, we examined the mother's direction of her 8-year-old child's memory activity. We argued that the mother and child jointly accomplished the child's cognitive performance on this task. For example, by talking aloud her thoughts as she classified the items that the child had to remember, the mother gave him a picture of how she would solved the memory problem. She worked to make these activities meaningful to the child

by anchoring their meaning both in the context of a family kitchen and in the context of the task demands of the experiment. We argued that the mother's work to establish and maintain a common framework for the processing of information was essential for the dyad's joint accomplishment of the task. We concluded that jointly working through cognitive tasks could be important in the socialization of children in cognitive skills, such as memory strategies.

Fo cusing on another dyad, Rogoff and Gardner found that both mother and child worked toward a transfer of responsibility for the direction of the task. The mother was observed subtly testing her child's readiness by reducing the amount of direction and organization she provided for a component of the task. If the child made an error or indicated a lack of readiness, the mother quickly reerected the 'scaffolding' she had momentarily removed. These negotiations of responsibility were often transacted through glances and other non-verbal cues, as in the section of transcript from this dyad given in the handout. Our interpretation of their actions was as follows: It appears from both this child's response to the mother's first question requesting identification of the item and from her reply to his attempt that she was searching for more than the name of the item. He provides the name of the item, but not the appropriate category lable. She provides the category label, and waits for him to place the item in the appropriate box. When action is not forthcoming from the child, the mother makes his job more concrete: finding another item in the same category. She takes this a step further and offers him a candidate by adjusting an item which would be an appropriate response to her latest question. He takes the cue, indicates the item she has been adjusting, and they finally get the item placed. Our paper consisted of sections of transcript with discussions providing evidence for the interplay of testing and feedback described above.

Although we are excited by what we have learned about the socialization of cognitive activity through our single-case ethnographies, we are now revising our approach again. When reading ethnographies, we often feel uneasy concerning how the author selected the incidents illustrating his or her points. In our own work we want to find a way to assess the generality of our findings and to portray the variability of approaches used by dyads. To achieve this, we are now attempting some comparative or multi-case ethnographies. The method of analysis is similar, but we are now working with a larger data base to find common patterns appearing across individuals.

We are working on two multi-case projects: Gardner is replicating the Gardner and Rogoff analysis on six dyads. Rogoff and Gauvain are analyzing all 32 dyads in an analysis performed in two stages. In the first stage, they summarize each dyad's progress in placing the items and preparing the child for the memory test. The transcript is broken into episodes that retain the sequence in which the actions occurred, but using terms applicable across dyads to describe them. For example, the episode represented in the sample transcript is recorded as follows:

> Eighth item placed, second one in compartment:
> Mother chooses item, child labels item and its function,
> Mother labels category and asks child for associated item while indicating a candidate, child indicates associated item.
> Mother and child each place item in box.

In the second stage of analysis we group the episodes into phases of instruction, including "Prelude", "Orientation to task", "Item placement", "readying for test", and "Exit". In each phase, the approach each dyad takes and how the responsibility for the components shifted during the instruction is summarized. We expect to be able to examine the prevalence of the structures found in the single-case ethnographies using these multi-case ethnographic approac

To conclude we will compare the four methodologies on five criteria:

1. What questions are the methods useful for answering?

2. How are the data analyzed?
3. How can the validity of the analysis be assessed?
4. How can the reliability and validity of the data collection process be assessed?
5. What statements can be made about the generality of the findings?

We should caution that it is difficult to compare these methods, since, first, statistical methodology is much more highly developed than ethnography for psychological research. In fact, statistical methodology typically defines what we consider psychology to be. Second, in both tracitional statistics and ethnography it is difficult to sort out the real potential of the methods from the ideal claims that have been made for them.

Frequency codes are most useful for questions concerning discrete behavioral events which can be assumed to follow some random distribution. These kinds of events occur naturally in many fields of study but, as we have argued,we are not sure that they are found in studies of social interaction. The discrete interactional event, whose meaning is identical across time and dyads, is an abstraction created for the sake of statistical analysis. This disadvantage, however, is compensated in part by what can be done with frequencies after they have been tallied. A well defined statistical hypothesis can be evaluated in an impersonal and objective fashion, with a calculable probability of error. Similarly, there is a well developed methodology for determining the reliability with which the frequencies were tallied. We suggest, however, that the level of abstraction of the data is also a hidden problem for reliability and analysis. Once the data base is coded into frequencies it is effectively hidden from everyone but the researchers. A researcher's interpretation of the theoretical meaning of statistical results always draws upon a deeper understanding of the data base than is captured in his or her summary of the frequencies. The reader could have a better check on the

validity of the coding process if he or she could have access to the raw material of the data base. Frequency codes do, however, provide ready means for comparing individuals within a study by using their profile of scores. They also explicitly provide information on the prevalence within the sample of the pattern of findings reported.

Fine-grained sequential analyses inherit most of the advantages and disadvantages of frequency codes. Sequential methods do allow researchers to ask some questions using sequence of events as a variable: for example, is a given behavior more prevalent earlier or later in the interaction? They can also be used to examine contingencies between behaviors: are errors by the child more likely following questions or directions by the mother? In practice, however, we believe that these are only modest advantages with respect to simple frequency codes. They are paid for in a less well developed statistical methodology and an exponential increase in the effort expended per study.

In single-case ethnography, one ignores questions of the prevalence of events across groups and seeks to extract the maximum of information from a single interaction. Since only one case is being discussed, there is no comparison of the effects of different conditions. Instead, the focus is shifted closer to the data base itself. The researcher seeks a consistent interpretation of the meaning signalled by the participants in the interaction. The interpretation is supported by the presentation of transcripts of portions of the interaction, which provide data for the reader to judge whether the transcribed evidence really does support the investigators' conclusions. However, there are no well developed methodologies for assessing the reliability of the transcription, nor are the precision and impersonality of statistical tests available. Finally, the rich data derived from a single case do not allow statements about generality beyond the case examined.

Our ventures into multi-case ethnography are attempts to remedy some of these problems. Our attention shifts from the richness of the single case to the communality of patterns within a group. We are working to develop methods whereby meaning can be discussed in terms that will allow us to assess the generality of its patterns. It will be necessary to develop rules for determining patterns and schematic ways of illustrating them. This will impose a greater degree of abstraction on the data than i a single case. The abstraction and larger database make it impossible to present more than a small portion of the data base to the reader in any research publication.

Through our exploration of these four research strategies, we have gained some appreciation of the advantages and tradeoffs of both the more traditional methods and the ethnographic approaches. At present we feel that all the approaches we have discussed are useful, with each of them appropriate for examining a different angle of data on the socialization of cognitive skills.

Four research strategies:

1. Frequency coding
2. Fine-grained sequential analysis
3. Single-case ethnography
4. Comparative ethnography

Sample of transcript from a mother and her 6-year-old son sorting photographs in the "homework" task:

MOTHER	CHILD
(picks up picture of bucket, holds it in front of child) What's that?	
	It's a bucket and it helps you carry things and... (fidgets)
Yeah, and it helps you clean. (looks at child)	
	(child nods)
Okay, what else, do you see something else that helps you clean? (adjusts the broom in the 'cleaning' box)	
	(watches mother's hand on bucket, then points to bucket, then to broom)
The broom, so it should be put in here. (holds bucket in 'cleaning' box)	
	(takes bucket from mother's hand and places in correct box) Yeah.

Five criteria for evaluating the research strategies:

1. What questions are the methods useful for answering?
2. How are the data analyzed?
3. How can the validity of the analysis be assessed?
4. How can reliability and validity of the data collection be assessed?
5. What statements can be made about the generality of the findings?